

REMARKS

In the Office Action, claims 1-7, 9-11, 18, 19, 24, 25 and 33 stand rejected under 35 U.S.C. 102 as being anticipated by Herrell et al (U.S. 4,860,444, hereafter “Herrell”). The rejection as related to specific groups of claims in the Office Action are addressed below.

Claims 1-6 and 9-11

Initially as to claims 1-6 and 9-11, the Office Action states that Herrell discloses in Figs. 1 and 5 probe elements having an overall package 10, substrate 26 coupled to/from a cavity (see Fig. 1; col. 5, lines 13-26), die 36, compliant spring like leads 38, and at least one coolant port that allows a coolant to enter the package via fluid inlet/outlet ports (see col. 4, line 62 to col. 5, line 6). This rejection is respectfully traversed.

Claim 1 recites “a package ... that allows a coolant to enter the package and directly cool the active electronic components of each die during a test operation.” In contrast, Herrell discloses microchannels 42 which carry coolant through a layer 40 adjacent the dies 36 to “indirectly” cool the die. Coolant in the present invention flows through a cavity 502 to contact with the die as disclosed in Applicant’s specification paragraph 63 to directly cool the die. Accordingly, Applicant maintains that claim 1 is not anticipated under 35 U.S.C. 102 by Herrell. Claims 2-6 and 9-11 are believed to be allowable as not anticipated by Herrell based at least on their dependence on claim 1.

Claim 7

Regarding claim 7, the Office Action states that o-rings are not discussed in Herrell, however, liquid cooling and seal means 28 of Fig. 1 are shown. The Office Action continues stating that the use of valves and specific seals is known in the art to control flow and prevent leakage, so this limitation of claim 7 would have been obvious. In response, Applicant maintains that claim 7 is allowable over Herrell based at least on its dependence on claim 1.

Claims 18-19

Regarding claims 18-19, the Office Action states that Herrell in Figs. 2, 3 and 8A discloses probe elements having an overall package 10 with dies 36 arranged compactly within the package (see Fig. 1). In response, Applicant maintains that claims 18-19 are allowable over Herrell based at least on their dependence on claim 1.

Claims 24-25 and 33

Regarding claims 24-25 and 33, the Office Action states that Herrell discloses in Figs. 1-2 and 5 a cooled package having an overall package 10, a coolant circulation system (col. 6, lines 4-37) that carries circulating coolant to and from the cooled package, substrate 26 coupled to/from a cavity (see Fig. 1; col. 5, lines 13-26), die 36, compliant spring like leads 38, and at least one coolant port that allows a coolant to enter the package via fluid inlet/outlet ports (see col. 4, line 62 to col. 5, line 6). Based on the above amendments and the following remarks, this rejection is believed to be overcome.

Claim 24, as amended, recites a “coolant circulation system” for “circulating coolant directly contacting the at least one die to transfer heat.” Similarly, claim 33, as amended, recites “means for circulating coolant through the package to directly contact that at least one die.” Herrell in contrast with the language of claims 24 and 33 discloses microchannels 42 that carry coolant through a layer 40 adjacent the dies 36 to “indirectly” cool the die. Coolant in the present invention flows through a channel to directly contact the die as disclosed in Applicant’s specification paragraph 63. Accordingly, claims 24 and 33 are not believed to be anticipated under 35 U.S.C. 102 by Herrell. Claim 25 is believed to be allowable as not anticipated by Herrell based at least on its dependence on claim 24.

New claims 35-36

New claims 35-36 recite that “probe elements extend external to the package.” In contrast, the leads 38 of Herrell are contained internal to its overall package 10. Accordingly, claims 35-36 are believed allowable as not anticipated by Herrell.

Conclusion

In light of the above amendments and remarks, claims 1-7, 9-11, 18, 24, 25, 33 and 35-36 are now all believed to be in condition for allowance. Accordingly, reconsideration and allowance of these claims is respectfully requested.

Respectfully submitted,

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By: Thomas A. Ward
Thomas A. Ward
Reg. No. 35,732

FLIESLER DUBB MEYER & LOVEJOY LLP
Four Embarcadero Center, Fourth Floor
San Francisco, California 94111-4156
Telephone: (415) 362-3800